POLYA'S METHOD OF ANASTOMOSING THE PROXIMAL GASTRIC STUMP WITH THE JEJUNUM

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THE hope that cancer of the stomach might be permanently cured by means of gastrectomy has in recent years been realized in many instances. More numerous are the cases in which life has been materially prolonged, and the procedure of gastrectomy has now been placed upon such a basis of technical skill that the rooted disbelief in its value, either palliative or curative, is being replaced by a feeling of hopefulness on the part of the general practitioner, with the result that the number of cases submitting to operation is steadily growing.

Later results are what we find them to be for three reasons: (1) the earlier diagnosis of cancer; (2) the increased frequency with which pylorectomy is performed upon cases which are diagnosed clinically as ulcer, in which subsequently the presence of secondary carcinomatous changes is demonstrated; and (3) the progressive improvement in surgical technique, which has enabled surgeons to include in the class of operable cases many of those which previously would have been rejected as inoperable, and to remove with constantly diminishing danger to life increasing areas of the stomach wall.

Before Polya demonstrated the practicability of anastomosing the proximal gastric stump, throughout its whole length, directly with the jejunum, there was a definite limit to the extent of stomach resection, because sufficient stomach wall had to be left for the establishment of a gastro-jejunostomy (Billroth method No. 2). This restriction was in part responsible for the frequency of recurrence. Among the technical defects of the method should be mentioned insufficiency in the gastro-jejunal anastomosis, the danger of tension and kinking in the anastomotic loop, and of necrosis in

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the suture line, arising from the defective blood supply on the stomach side. These various causes of failure were met by Polya, and a thorough trial of his method confirms his original contentions: (1) that this procedure of gastro-jejunostomy is easily performed; (2) that union between the stomach and the intestine is effected without tension; (3) that necrosis or leakage is unlikely to occur; (4) that the mechanical conditions for the emptying of the stomach are as favourable as possible, because the opening is broad and lies at the aboral end of the gastric stump; and (5) that the operation can be done much more quickly than the former procedure, which, owing to its lengthiness, had often to be done in two stages.

According to Polya's method, the jejunal loop is brought up through a slit in the mesocolon. By this means freedom of action is secured. At the conclusion of the anastomotic suture, the stump of the stomach is drawn down through the opening in the mesocolon, and the edges of the mesocolon are secured to it. If a high resection is performed, this latter stage may present serious difficulties. In such cases the small bowel should be brought up in front of the transverse colon, and the anastomosis with the jejunum performed at a distance of from fifteen to eighteen inches from its origin. By this method, as shown by Balfour, the death rate has been very greatly reduced.

When Polya published his article in 1911, he had tried his method in six cases. Three of the patients died within from twenty-four to forty-eight hours after operation; and a fourth, from erysipelas and duodenal fistula, on the forty-ninth day after operation. The other two left the hospital cured.

In the three cases here reported Polya's original procedure was followed in each instance. In none did vomiting occur after operation, and all three patients left the hospital free from symptoms.

Case 1. T. T., aged forty-two, a Russian labourer, was admitted to the Montreal General Hospital on May 18th, 1917, complaining of pain in the stomach and vomiting.

The personal and family histories were negative.

Although admitting that he had suffered from attacks of indigestion for ten or twelve years, the patient stated that his present illness began eight months ago, with pain in the epigastrium, which came on from two to four hours after meals and radiated to the right shoulder and back. More recently there had been vomiting. The pain was relieved by vomiting and by taking food. The patient had never noticed blood in the vomitus or stools. The appetite was poor. There had been a loss of thirty pounds in

weight during the preceding eight months. The patient was pale and poorly nourished. He had almost constantly a feeling of distress or pain in the epigastrium. On examination a distinct mass was felt in the region of the pylorus.

Test Meal. 300 c.c. given. In seventy minutes 270 c.c. withdrawn. Reaction, acid; free HCl absent; total acidity, 26; no occult blood.

A bismuth series taken by Dr. Wilkins showed the following:

"Meal enters stomach without feature. Outline of stomach regular except at pyloric area, where defect is visible. Duodenum does not form. Tenderness present over pylorus Large, actively contracting stomach. At six hours half of meal is still present.

Summary. There is a lesion at the pylorus. The general action and appearance of the stomach would suggest ulcer rather than carcinoma."

While the history and radiographic findings pointed to the probability of a chronic peptic ulcer, the presence of a mass, the true anorexia, and the absence of free hydrochloric in the gastric secretion, suggested the possibility of carcinoma.

Operation. On May 23rd, 1917, under ether anæsthesia, an incision was made through the right rectus, exposing a large, indurated, inflammatory mass, occupying the greater part of the lesser curvature of the stomach. There were numerous enlarged, soft glands in the gastro-hepatic omentum and beneath the pyloric ring. The fundal portion of the stomach was very greatly dilated.

After preliminary ligation of the vessels, the pylorus was divided immediately distal to the ring, and the cut edges were cauterized. The duodenum was closed with continuous through-and-through suture of chromicized gut, followed by musculo-serous suture with linen. The stump was then buried in the capsule of the pancreas. As much of the fundal portion of the stomach as possible was then withdrawn from the wound; the jejunum was passed upward through a rent in the transverse mesocolon, and the posterior sero-muscular suture of the stomach to the jejunum was inserted. The stomach was then divided with cautery, distal to the clamp. The jejunum was opened, and the suture of the anastomosis completed in the usual way, using a chromicized gut for the through-and-through mucous stitch. After the removal of the clamps, the stump of the stomach was drawn through the rent in the mesocolon, and the mesocolon stitched to the stomach 1 cm. above the suture line. Although a very large resection of the stomach was carried out, there still remained, owing to its hypertrophy and dilatation, a large

fundal pouch, and no difficulty whatever was experienced in suturing the mesocolon above the line of anastomosis.

Following the operation, hypodermics of strychnine (grs. 1-40) and camphor (gr. 1) were administered every four hours. Six ounce rectal salines, containing 5 per cent. dextrose, were given at similar intervals. There was no vomiting. Lenhartz diet was begun on the fifth day, and convalescence was uninterrupted.

On June 21st, 1917, Dr. Wilkins took a second bismuth series, with the following result:

"Meal passes down œsophagus without feature. Stomach is pyramidal in shape apparently about half of distal portion having been excised. Meal leaves stomach quickly. At one and one-half hours less than one-eighth of meal is present. At three hours the quantity is practically unchanged and the meal is entering the large bowel. At six hours the stomach is empty and practically the entire meal is in the large bowel."

Pathological report. "Adeno-carcinoma. The gross appearance is suggestive of old healed peptic ulcer with malignancy superimposed."

The patient was discharged on June 28th, 1917.

On December 3rd, 1917, he was re-admitted. His general condition showed a marked improvement, and there had evidently been a gain in weight. The abdomen was soft, without palpable mass or visible peristalsis. The patient was free from pain, had a good appetite, and could take anything in the way of ordinary diet. In September, 1917, he had had an attack of burning pain in the epigastrium, which bore no relation to the taking of food and was not present at night. There had been no vomiting.

Test meal. 300 c.c. given. In one hour a residue of 120 c.c. withdrawn. Free HCl., 48; combined acid, 24; total acidity, 72.

An *x*-ray series was taken by Dr. Wilkins on December 4th, 1917.

"Meal enters stomach in normal manner and commences to leave early by gastro-enterostomy opening. At three hours the stomach is empty, head of column being at splenic flexure. At six hours the entire meal is in large bowel."

Case 2. W. C., aged thirty-five, a sailor, was admitted to the Montreal General Hospital on September 4th, 1917, complaining of epigastric pain, nausea, and vomiting.

The family history was negative.

Personal history. For the past eighteen years the patient had

been doing manual labour. For eight or ten years he had used alcohol and tobacco to excess. At twenty-five he had a syphilitic infection, which was treated at that time for two months with mercury. More recently he had been treated with salvarsan. At twenty-seven he had gonorrhœa.

Present illness. In April, 1913, he first noticed pain in the epigastrium, occurring directly after eating and lasting for about one hour. The appetite remained good, and there was no loss of weight. Between October, 1913, and April, 1914, the patient was free from all symptoms. On the latter date the symptoms which had been present in the first attack returned with increased severity. Practically the same periods of discomfort, alternating with freedom from all symptoms, recurred until 1917. In April, 1917, pain in the epigastrium returned with much more severity. There was a severe burning sensation after eating, and tenderness over the epigastrium. The patient was relieved by taking soda, but not by taking more food. In June, 1917, vomiting occurred for the first time and subsequently about once a day. As it invariably relieved the pain, the patient learned to induce it. Blood was never noticed in the vomitus or in the stools. Although his appetite was good, the patient refrained from eating, because he feared the pain which followed. With this restriction in diet there was between June and September, 1917, a loss of about thirty-five pounds in weight.

Examination on admission to the surgical service. October 7th, 1917. The patient was very thin and had apparently lost a great deal of weight. All the teeth were either crowned or filled. The thoracic organs were normal. There was no glandular enlargement. The abdomen was scaphoid, with well marked tenderness in the epigastrium and in the regions of the pylorus. There was no palpable tumour. The bowels were constipated.

Ewald's test meal. 300 c.c. given. In one hour 200 c.c. withdrawn. Total acidity, 25; free HCl absent; no occult blood.

There was a triple Wassermann reaction.

An *x*-ray series by Dr. Wilkins showed the following:

"Meal enters stomach without feature. Stomach rather small, atonic. Tenderness present in epigastrium. Lower border at umbilicus. At one and one-half hour about one quarter of meal remains. At three hours the quantity is unchanged. At six hours the quantity is slightly less and about one half of meal has entered the large bowel.

Summary. The presence of tenderness, associated with six-hour retention, would suggest pyloric ulcer."

Operation. On October 10th, 1917, an incision was made through the right rectus, exposing a small stomach, with an area of marked induration astride the lesser curvature at the junction of the vertical and horizontal portions of the stomach. There were enlarged soft glands in the gastro-hepatic omentum. It was at first decided to excise the ulcer. After the removal of the indurated area, however, it was found that, at the margin of the ulcer, there were numerous friable papillomatous masses, very suggestive of malignancy; that there was extensive superficial ulceration of the whole of the pyloric portion of the stomach; and that at the pyloric ring a second chronic ulcer was surrounded by similar papillomatous growths. It was therefore decided to do a gastrectomy. The ordinary procedure was followed in closing the stump of the duodenum. The stomach was then drawn down as far as possible, and the whole of the fundal portion removed with the exception of a small pouch. Anastomosis was then effected between the stump of the stomach and the lateral wall of the jejunum, which was brought up through a rent in the transverse mesocolon. In this case, contrary to the experience in Case 1, there was some difficulty in suturing the margins of the divided mesocolon to the stump of the stomach, and one might better have followed the more recent practice of bringing the jejunum up to the stomach stump in front of the transverse mesocolon.

Pathological report. "Gastr tis polyposa (precancerous)."

Convalescence was uneventful. The wasting was very profound for the first ten days after operation, but there was no vomiting. The usual post-operative measures were followed. Lenhartz diet was begun on the fourth day.

On November 1st, 1917, a further *x*-ray examination was made by Dr. Wilkins, who reported as follows:

"Meal passes down œsophagus without feature, and leaves very rapidly by the gastro-enterostomy opening. Capacity of the stomach extremely small. The stomach is apparently empty within fifteen minutes. At one and one-half hours the head of column is at sigmoid. At six hours there is no change of importance

Summary. The feature of note in this case is the extreme rapidity with which the stomach empties."

The patient was discharged on November 5th, 1917.

Case 3. X. C., a farm labourer, was admitted to the surgical service of the Montreal General Hospital on October 30th, 1917, complaining of epigastric pain and vomiting.

The family and personal histories were negative.

In 1910 the patient began to be troubled with pain, which came on about two hours after meals, starting in the epigastrium and radiating to the back. For the past four years there had been almost daily vomiting. Between 1910 and 1917 the patient had lost about fifteen pounds in weight.

On admission he was found to be well nourished. The teeth were in good condition. The bowels were regular. General examination was negative. On deep palpation there was tenderness beneath the left costal arch.

After admission the patient complained daily of pain in the epigastrium, coming on about two hours after the taking of food. Vomiting usually occurred late each afternoon.

A bismuth series by Dr. Wilkins on October 26th, 1917, showed the following condit ons:

"Meal enters stomach without feature. Normal, tonic, vertical stomach, regular in outline. Lower border below umbilicus. No tenderness present on pressure. Pain, when present, is said to be in epigastrium. At one and one-half hours about one half of meal is present. At six hours the quantity is unchanged. The duodenum forms well, but at the pyloric orifice is a slight protrusion which is indicative of ulcer.

Summary. The marked six-hour retention and the presence of irregularity in pyloric orifice is indicative of ulcer."

Test meal. 300 c.c. given. In one hour 275 c.c. withdrawn. Free HCl, 46; total acidity, 69; no occult blood; no sarcinæ or Boas Oppler bacilli.

Operation. On November 2nd, 1917, an incision was made through the right upper rectus. The stomach was withdrawn from the abdomen with difficulty. A large saddle-shaped ulcer occupying the lesser curvature and several small ulcers involving the greater part of the pyloric portion of the stomach were found. Owing to the extent of the disease it was decided to do a complete pylorectomy There were no enlarged lymphatic glands. After closure of the duodenal stump and complete removal of the pyloric portion of the stomach, anastomosis between the gastric stump and the jejunum was effected by Polya's method.

Lenhartz diet was begun on the fourth day of convalescence.

There was no vomiting after operation. The patient was discharged on November 24th, 1917, free from symptoms.

Pathological report. Chronic peptic ulcer.

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THE *British Medical Journal* finds that the war has caused a marked decline in the proportion of suicides to the population. Among males the rate per million was 157 in the ten years ending 1910, 151 in 1914 and 105 in 1915. In 1916 it was a little higher, 111. The rate of suicides among women showed a fall from forty-seven in the years 1901-10 to forty-five in 1914 and 1915 and thirty-eight in 1916. The greatest reduction among men was at the ages of forty-five to sixty-five whereas for women of later middle age the rate had not fallen at once. The reason for this according to the Journal, is the increased employment opened up by the war. Fresh interests and diversions have given the mind a new outlook on life.